APPENDIX I

ALL PENDING CLAIMS WITH AMENDMENTS EFFECTED THEREIN

1. (Currently Amended) An image processing device for applying a certain process to input image data in accordance with gradation data of a plurality of color components for each pixel of an image represented by the input image data, comprising:

an unwanted gradation condition provider for providing a condition for determination of unwanted gradation for each of a plurality of color components;

an unwanted pixel determining unit for determining pixel by pixel whether all the gradation data for each pixel of the image in regard to the color components satisfy respective unwanted gradation conditions provided by the unwanted gradation condition provider; and

an unwanted pixel gradation converter for converting, into a predetermined gradation, the gradation data of the plurality of color components of the pixel having gradation data that have been determined to satisfy the unwanted gradation conditions by the unwanted pixel determining unit, said predetermined gradation being set with respect to each one of the color components.

2. (Currently Amended) The image processing device according to claim 1, wherein said unwanted gradation condition provider includes an unnecessary image gradation determining unit for determining, for

each of the color components, a gradation of an unnecessary image which is deemed to be unnecessary for reproduction, and an unwanted gradation condition setting means for setting the unwanted gradation condition in accordance with the gradation of unnecessary image data.

3. (Currently Amended) The image processing device according to claim 2, wherein said unnecessary image gradation determining unit is adapted to determine a gradation of an undertone portion in the image represented by the input image data as the gradation of the unnecessary image.

4. (Currently Amended) The image processing device according to claim 2, wherein said unnecessary image gradation determining unit is adapted to determine a gradation of an undertone portion and a backside image portion in the image represented by input image data as the gradation of the unnecessary image.

5. (Currently Amended) The image processing device according to claim 2, wherein said unnecessary image gradation determining unit is adapted to

determine a gradation of a backside image portion in the image represented by the

input image data as the gradation of the unnecessary image.

6. (Currently Amended) The image processing device according to claim

2, wherein said unnecessary image gradation determining unit is adapted to

determine a gradation range of the unnecessary image with respect to each one of

the color components in accordance with gradation data of the input image data to

set the unwanted gradation condition.

7. (Currently Amended) The image processing device according to claim

6, wherein the unnecessary image gradation determining unit includes a histogram

providing unit for providing a histogram showing the number of pixels at each

gradation as a frequency of gradation, with respect to each of the color components

of the input image data, a frequency checker for checking the frequency of each

gradation from a lower gradation, a gradation detector for detecting, in the

histogram, a specific gradation that satisfies a predetermined detection condition

with respect to each one of the color components, and a gradation range

determining unit for determining the gradation range of the unnecessary image data

based on the detected gradation.

8. (Currently Amended) The image processing device according to claim 7, wherein the unnecessary image gradation determining unit includes a smoothing processing unit for smoothing a curve in the histogram.

9. (Currently Amended) The image processing device according to claim 7, wherein the detection condition for the detection of the specific gradation is either (I) or (II) presented below:

(I) the specific gradation is given a gradation value at which a slope of a curve in the histogram shifts from negative to positive;

(II) the specific gradation is given a gradation value at which a change rate of a slope of a curve in the histogram shifts from negative to positive.

10. (Currently Amended) The image processing device according to claim 7, wherein the detection condition for the detection of the specific gradation is either (I), (II), or (III) presented below:

(I) the specific gradation is given a gradation value at which a slope of a curve in the histogram shifts from negative to positive;

(II) the specific gradation is given a gradation value at which a change rate of a slope of a curve in the histogram shifts from negative to positive;

(III) the specific gradation is given a gradation value at which a slope of a curve in the histogram is negative, and a ratio of the frequency of the gradation value to a sum of the frequencies of the gradations lower than the gradation value is or is smaller than a predetermined value.

11. (Currently Amended) The image processing device according to claim 9, wherein the unnecessary image gradation determining unit is adapted to set, as a detection start gradation, a lowest gradation having a frequency exceeding a predetermined frequency and start detection of the gradation from the detection start gradation toward a higher gradation.

12. (Currently Amended) The image processing device according to claim 7, wherein the unnecessary imagegradation determining unit is adapted to set, as a detection start gradation, a lowest gradation having a frequency exceeding a predetermined frequency and judge whether a first detected gradation satisfies one of conditions (I), (II), (III) and (IV) presented below when searching for a target gradation from the detection start gradation toward a higher gradation:

(I) the target gradation is given a gradation value at which a slope of a curve in the histogram shifts from negative to positive;

(II) the target gradation is given a gradation value at which a change rate of a slope of a curve in the histogram shifts from negative to positive;

(III) the target gradation is given a gradation value at which a slope of a curve in the histogram is negative, and a ratio of the frequency of the gradation value to a sum of the frequencies of the gradations lower than the gradation value is or is smaller than a predetermined value;

(IV) the target gradation is given a gradation value at which a distance from the detection start gradation value toward a higher gradation value is equal to or greater than a predetermined value.

13. (Currently Amended) The image processing device according to claim 7, wherein the unnecessary image gradation determining unit is adapted to set, as the gradation range of the unnecessary image, a gradation range extending to a lower gradation from a first detected gradation which is detected first as satisfying the specific condition when the target gradation is searched for from a lower gradation side in the histogram.

14. (Currently Amended) The image processing device according to claim 7, wherein the unnecessary image gradation determining unit is adapted to set, as the gradation range of the unnecessary image, a gradation range extending to a

lower gradation from a second detected gradation which is detected at second times

as satisfying the specific condition when the target gradation is searched for from

a lower gradation side in the histogram.

15. (Currently Amended) The image processing device according to claim

7, wherein the unnecessary image gradation determining unit is adapted to

selectively set, as the gradation range of the unnecessary image, a gradation range

extending to a lower gradation side from a first detected gradation or a gradation

range extending to the lower gradation side from a second detected gradation, the

first and second detected gradation being detected at first and second times

respectively when the target gradation is searched for from the lower gradation side

in the histogram.

16. (Currently Amended) The image processing device according to claim

7, wherein the unnecessary image gradation determining unit is adapted to respond

to an input operation of an operator to selectively set, as the gradation range of the

unnecessary image, a gradation range extending to a lower gradation side from a

first detected gradation or a gradation range extending to the lower gradation side

from a second detected gradation, the first and second detected gradation being

detected at first and second times respectively when the target gradation is searched

for from the lower gradation side in the histogram.

17. (Currently Amended) The image processing device according to claim

1, wherein the unwanted pixel gradation converter is adapted to convert the

gradation data satisfying the unwanted gradation conditions, into a lowest one of

the gradations that can be output by the image processing device.

18. (Currently Amended) The image processing device according to claim

6, wherein the unwanted gradation condition provider is adapted to determine, as

a threshold value for the determination of unwanted gradation, an upper limit of the

gradation range determined by the unnecessary image gradation determining unit,

the unwanted gradation condition being that the gradation is lower than the

threshold value.

19. (Currently Amended) The image processing device according to claim

7, wherein the unnecessary image gradation determining unit is adapted to set, as

the gradation range for the unnecessary image, a range extending between a first

detected gradation and a second detected gradation, the first and second detected

gradations being detected at first and second times respectively when the target gradation is searched for from a lower gradation side in the histogram.

20. (Currently Amended) The image processing device according to claim 19, wherein the unwanted pixel gradation converter is adapted to convert the gradation data satisfying the unwanted gradation conditions, into gradation data of an undertone in the input image data.

21. (Currently Amended) The image processing device according to claim 20, wherein the gradation data of the undertone is determined based on the first detected gradation which is detected first when the target gradation is searched for from the lower gradation side in the histogram.

22. (Currently Amended) The image processing device according to claim 18, further comprising:

an adjusted pixel determining unit for judging whether a pixel having gradation data that does not satisfy the unwanted gradation condition with respect to at least one of the color components is an adjusted pixel that satisfies a certain adjusting gradation condition which is predetermined with respect to each one of the color components, the judgment being made with respect to all the gradation data of the plurality of color components of the pixel; and

an adjusted pixel gradation converter for converting each one of the gradation data of the plurality of color components of the adjusted pixel into a gradation lower than an original gradation of the adjusted pixel in the image represented by the input image data.

23. (Currently Amended) The image processing device according to claim 22, wherein the adjusting gradation condition is set such that the gradation is lower than a predetermined adjusting gradation threshold value.

24. (Original) The image processing device according to claim 23, wherein the adjusting gradation threshold value is determined based on the unwanted gradation threshold value.

25. (Currently Amended) The image processing device according to claim 23, wherein the adjusted pixel gradation converter is adapted to convert a gradation data of each one of the color components of each one of the adjusted pixels into a data of a gradation that is computed in accordance with the gradation in the image represented by the input image data by means of a function having parameters of the unwanted gradation threshold value and the adjusting gradation threshold value with respect to each one of the color components.

26. (Currently Amended) The image processing device according to claim 23, wherein the adjusted pixel gradation converter is adapted to set a common gradation lowering rate and lower the gradations of adjusted pixels with the common gradation lowering rate which is common to all the color components, thereby adjusting the gradations of the adjusted pixels,.

27. (Currently Amended) The image processing device according to claim 26, further comprising:

a target color component setter for setting, as a target color component, one of the plurality of color components of each one of the pixels of the image represented by the input image data, wherein

the adjusted pixel gradation converter is adapted to set the common gradation lowering rate with respect to each one of the adjusting pixels depending on the gradation of the target color component.

28. (Currently Amended) The image processing device according to claim 27, wherein the target color component setter is adapted to set, as the target color component, a color component having a smallest distance relative to the adjusting pixel threshold value, among the plurality of color components composing each one of the adjusted pixels.

29. (Currently Amended) The image processing device according to claim 27, wherein the adjusted pixel gradation converter is adapted to determine the common gradation lowering rate in accordance with the gradations of the target color component of each adjusted pixel in the image represented by the input image data, by means of a function having parameters of the unwanted gradation threshold value with respect to each one of the color components.